

**SAFE DRINKING WATER ACT
CAPACITY DEVELOPMENT REPORT
SEPTEMBER 2002**



**MARYLAND DEPARTMENT
OF THE ENVIRONMENT
WATER SUPPLY PROGRAM**

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Executive Summary

The Maryland Water Supply Program (WSP), within the Maryland Department of the Environment (MDE), is the responsible primary agency for the implementation of the Safe Drinking Water Act. In the latter part of calendar year 2000, the WSP developed a capacity development strategy intended to further improve the technical, managerial and financial “capacity” or capability of Maryland’s public drinking water systems to consistently provide safe drinking water. The intent of WSP’s capacity development strategy has been to effectively prioritize technical assistance and training to public drinking water systems with the ultimate goal of improving water system compliance and public health protection. Section 1420(c)(3) of the Safe Drinking Water Act (SDWA) requires that by September 30, 2002 and every three years thereafter the head of the State agency must submit a report to the Governor on the efficacy of the strategy and the progress made toward improving capacity. This report is the first such report to the Governor.

MDE has been performing several activities that assist water systems to improve their technical, managerial, and financial capacity. In particular, sanitary surveys, training and technical assistance, Comprehensive Performance Evaluations, water quality monitoring, operator certification, financial assistance, promote consolidation of water systems, county water and sewer planning, source water assessments and special initiatives are activities which have improved compliance and capacity. Several case studies, which are discussed in the appendix, illustrate the progress made towards improving capacity of public water systems.

Implementation of the strategy has focused on establishing a baseline from which future improvements will be measured. The baseline includes self-assessment surveys, compliance, operator certification, and sanitary surveys. In particular, gathering data from water systems via self-assessment surveys was a new initiative. Data from the baseline will be used to coordinate training and assistance opportunities for water systems in order to meet the capacity development goals established in this report. The capacity development strategy will continue to provide a means to evaluate the overall “health” or capacity of Maryland’s water systems and to document improvements made.

What is Capacity Development?

Capacity development is the process of water systems acquiring and maintaining adequate technical, managerial, and financial capabilities to enable them to consistently provide safe drinking water. To have “capacity”, a water system must have the technical abilities, managerial skills, and financial resources to meet State and federal drinking water regulations. Technical capacity refers to the physical infrastructure of the water system, including but not limited to, the source water adequacy, infrastructure adequacy (including wells or water intakes, treatment, storage, and distribution), and the ability of the system personnel to implement the requisite technical knowledge. Managerial capacity refers to the management structure of the water system, including but not limited to ownership accountability, staffing and organization, and effective external linkages. Financial capacity refers to the financial resources of the water system, including but not limited to the revenue sufficiency, credit worthiness, and fiscal controls. “Capacity development” is an effort by the Maryland Department of the Environment to help drinking water systems improve their finances, management, infrastructure, and operations so they can provide safe drinking water consistently, reliably, and cost-effectively.

The 1996 SDWA Amendments require States to create mechanisms to prevent the creation of new nonviable community and nontransient noncommunity public waterworks and to develop a strategy to address the capacity of all existing public waterworks. The Maryland capacity development regulation for *new* drinking water systems became effective October 1999. The capacity development strategy, which is a non-regulatory approach to improve the capacity of *existing* water systems, was approved by the Environmental Protection Agency (EPA) in September 2000. The intent of the capacity development strategy is to continue with effectively prioritizing technical assistance to public drinking water systems. In July 2001 a report regarding the success of enforcement and capacity development mechanisms in helping systems with a history of significant non-compliance was issued to the EPA by the WSP in accordance with SDWA requirements.

Why Was This Report Created?

Section 1420(c)(3) of the Safe Drinking Water Act (SDWA) requires that *not later than two years after the date on which a State first adopts a capacity development strategy, ... and every three years thereafter, the head of the State agency ... shall submit to the Governor a report that shall also be available to the public on the efficacy of the strategy and progress made toward improving the technical, managerial and financial capacity of public water systems in the State.*

This first report to the Governor will be made available to the public and will address the efficacy of the State's capacity development strategy and the progress made towards improving the technical, managerial and financial capacity of public water systems. It will detail the Water Supply Program's endeavors to improve capacity of Maryland's public drinking water systems.

Maryland's Water Supply Program

The Water Supply Program (WSP) is responsible for regulating public drinking water systems in Maryland and implementing capacity development. The WSP is a part of the Water Management Administration within the Maryland Department of the Environment. The mission of the WSP is to ensure that public drinking water systems provide safe and adequate water to all present and future users in Maryland, and that appropriate usage, planning and conservation policies are implemented for Maryland's water resources. This mission is accomplished through proper planning for water withdrawal, protection of water sources that are used for public water supplies, oversight and enforcement of routine water quality monitoring at public water systems, regular onsite inspections of water systems, and prompt response to water supply emergencies. In addition to ensuring that public drinking water systems meet federal and State requirements, the WSP also oversees the development of Source Water Assessments for water supplies, and permits water appropriations for both public drinking water systems and commercial entities Statewide. Because all of these programs reside together in the WSP, Maryland has the unique opportunity to evaluate, regulate and assist public drinking water systems from a broad perspective that promotes achieving the intent of the capacity development effectively. The Water Supply Program's activities help to ensure safe drinking water for more than 4 million Marylanders.

Public drinking water systems fall into three categories. Community water systems (CWS) serve year-round residents, non-transient non-community (NTNC) water systems serve regular consumers, such as in a school or daycare setting, and transient non-community (TNC) water systems serve different consumers each day, such as in a campground or restaurant. The WSP directly regulates community and NTNC water systems. Currently, transient non-community water systems are regulated and enforced by the local county environmental health departments through agreements with MDE, with the exception of systems in Prince George's, Montgomery, and Wicomico Counties, which are regulated and enforced by the Water Supply Program. Maryland has 503 community water systems, 568 non-transient non-community water systems, and 2,745 transient non-community water systems. Table 1 below lists several drinking water statistics for Maryland.

Table 1. Drinking Water Statistics	
Population of Maryland (2001)	5,296,486
Individuals served by community water systems	4,438,335
Percent of population served by public water systems	84%
Percent of population served by individual wells	16%
Number of Public Water Systems	3816
Number of Community Systems (CWS)	503
Number of Non-transient Non-community Systems (NTNCWS)	568
Number of Transient Non-community Systems (TNCWS)	2,745
Number of systems using surface water	64
Number of systems using only ground water	3,752

Improving Capacity

Implementation of the Capacity Development Strategy is new to WSP, but conducting capacity-enhancing activities is not. Historically, WSP has emphasized preventative measures to avert serious public health incidents, instead of reactive enforcement actions. The vast majority of drinking water violations are corrected immediately or following issuance of public notices. Preventative measures include activities such as sanitary surveys, training and technical assistance, Comprehensive Performance Evaluations, monitoring, operator certification, financial assistance, consolidation, county water and sewer planning, source water assessments, and special initiatives. Table 2 summarizes a number of these preventative measures. Descriptions of several capacity-enhancing activities follow.

Table 2. Water Supply Program's Major Activities for the Year 2001

Sanitary Surveys Conducted of CWS and NTNCWS	999
Sanitary Surveys Conducted of TNC Systems (by local gov't and MDE)	421
Comprehensive Performance Evaluations Conducted	8
Technical Reviews of Water Construction Projects	50
Water Appropriation Permits Issued (New and Renewal)	1,724
Individuals Certified to Sample Drinking Water	932
New Wells Sited	46
Water Quality Reports Reviewed	41,138
Source Water Assessments Completed	134

Sanitary Surveys

Sanitary surveys involve an assigned public health engineer or sanitarian performing an on-site inspection. The assigned staff will meet with either the chief operator or owner and ask them system-related questions, inspect the water treatment plant, test the water, and attempt to resolve any outstanding issues. Sanitary survey inspections are performed on a frequent basis whereby community, surface water, groundwater under the direct influence of surface water (GWUDI), and non-compliant systems receive the highest priority. The frequency of most sanitary surveys ranges from approximately once per year to once per three years. Follow-up is requested for any deficiency that could affect either the quality or reliability of water produced by a system.

Training and Technical Assistance

WSP organizes and conducts training and technical assistance for operators, technical professionals, and managerial staff. For instance, the annual Ground Water Symposium provides a forum for professionals across the State to exchange information on innovative technology solutions and promote protection of Maryland's groundwater. WSP routinely provides technical information to system operators and owners, especially during sanitary surveys or in follow up customer complaints or system emergencies.

In addition to directly providing training and technical assistance opportunities, WSP maintains working relationships with non-profit organizations that perform training sessions and on-site technical assistance for water systems and their operators. Three

organizations that provide training to water systems are the Maryland Center for Environmental Training (MCET), the Maryland Rural Water Association (MRWA), and Southeast Rural Community Assistance Project, Inc. (RCAP). MCET provides operator certification training, on-site technical assistance, and operational, managerial and financial training. MDE funds a MRWA circuit rider who trains operators of small systems. WSP refers systems in need of assistance to the MRWA, and the MRWA's circuit rider provides hands-on training to system operators for chemical feed systems, leak detection, corrosion control, and consumer confidence reporting. Southeast RCAP, in cooperation with the Environmental Finance Center (EFC), has provided training in financial capacity. In addition, RCAP, in cooperation with WSP, has assisted at least one community system with their ownership and operations problems. Through cooperative efforts with MCET, MRWA, RCAP, and EFC, WSP provides training and assistance that helps system owners, operators, and managers keep their water systems in compliance.

Comprehensive Performance Evaluations

The primary purpose of a CPE is to evaluate the performance of a surface water treatment plant to determine if the plant is optimized for removal of particles and parasitic organisms such as *Giardia* and *Cryptosporidium*. The CPE assists in identifying areas of potential improvement in the operation, maintenance, design, and administration of the plant in order to achieve optimized plant performance. Since 1990, when WSP began using this evaluation, the process has helped improve surface water systems' technical, managerial, and financial capacity and has strengthened drinking water treatment understanding among administrators and operators across the State. Because of these benefits, WSP plans to continue to perform CPE's, with periodic re-evaluations, at Maryland's surface water plants.



WSP Staff conducting CPE at a system in central Maryland

Monitoring

All public water systems must monitor their water on a frequent basis for various contaminants. WSP employs four separate technical assistance mechanisms related to monitoring that assist systems remain in compliance.

Yearly monitoring schedules In September 1995, the State of Maryland began sending yearly monitoring schedules, which lists all required contaminant sampling, to each community and NTNC system. This process increased the efficiency and effectiveness of tracking a system's monitoring and improved monitoring compliance. The monitoring schedule mailing often includes information about new and future regulations and is used as a reference by many systems throughout the year.

MDE-provided Sampling MDE assists in the sampling for a number of contaminants at small community and NTNC systems.

Waiver Plan WSP has an EPA-approved waiver plan and may issue certain contaminant-specific waivers to systems. These waivers are based on susceptibility of the source water, location of the source and potential for the occurrence of the contaminant.

Monthly Operating Report Reviews WSP requires community and NTNC public water systems that provide treatment to complete and submit operating reports on a monthly basis. Because MORs provide day-to-day information on how a plant is performing, they can assist WSP in identifying any systems that may have compliance or capacity needs.

Operator Certification

Maryland's operator certification program has been in effect for over 30 years. The EPA recently established operator certification guidelines and in July 2001 the EPA approved Maryland's operator certification program. Maryland's certification program verifies that water system employees are trained to operate water systems based on the complexity of the water treatment plant (WTP). All community and NTNC public water systems are required to have properly certified personnel to operate their WTPs. MDE administers this program through the Board of Waterworks and Waste Systems Operators. The Board establishes training, experience, testing, and education requirements for WTP operators depending on a system's classification. Public water systems are classified into categories based on the treatment complexity. The more complex systems have more difficult prerequisites for certification. Training requirements for recertification also increase with system complexity.

Financial Assistance

MDE's Financial Assistance Program and the Drinking Water State Revolving Fund (DWSRF) provide systems financial assistance through either grants or loans.

The purpose of the Financial Assistance Program is to assist small communities with infrastructure needs and insufficient or limited financial capabilities correct water supply related health problems and to meet SDWA requirements. Typical projects under this program include well development, upgrade of water treatment facilities, water storage tanks, and water distribution facilities. Applicants may be required, to develop a plan of action to provide for financial stability of the system in the future. Because the Financial Assistance Program provides grants tailored more towards correcting potential or real health and water quality problems, this is an excellent mechanism MDE utilizes to prevent or correct noncompliance at small community systems and improve water system technical capacity.

In addition to providing grants, MDE supplies financial assistance through the DWSRF. The purpose of the DWSRF is to make low-interest-rate loans to both community water systems and non-profit non-community systems for drinking water infrastructure

projects. Projects considered for funding are ranked based on the following four criteria:

- Acute, chronic, and potential health problems;
- Compliance-related projects;
- Correction of environmental, public safety, or system reliability problems; and
- Community income and project affordability.

These criteria ensure that water systems that are in noncompliance and need funding to improve their technical capacity are ranked high as a funding priority. Furthermore, systems applying for DWSRF loans must develop a plan for future financial stability and must meet capacity requirements. These measures ensure systems with technical, managerial and financial capacity receive funds.

Consolidation

It is WSP's policy to always consider consolidation of small water systems when feasible. Whether two or more small systems merge into one larger system, or a large system extends its service area to a smaller one, consolidation affords systems the advantage of having a greater pool of resources to provide a safer and more reliable water supply. The WSP encourages consolidation as a way to correct capacity and non-compliance problems. With more upcoming regulations, it will become increasingly more difficult for smaller, independent systems to remain compliant. With the greater amount of resources afforded to consolidated systems, they should find compliance with SDWA regulations less of a burden.

County Water and Sewer Planning

In 1997, the Maryland Legislature enacted Smart Growth legislation limiting most State infrastructure funding to areas that local governments designate for growth. Through the Smart Growth planning process, preference, for specific State funding, including DWSRF, is given to infrastructure improvement projects that are in the Priority Funding Areas (which are areas of existing or planned growth). All new water systems must be incorporated in the County Comprehensive Water and Sewer Plans before a MDE Construction Permit is issued. This requirement helps to prevent unnecessary new systems. These planning processes generally encourage consolidation of small systems to improve system reliability and economy. In addition, the County Water and Sewer Plans assist in the long-term planning of water resources and treatment plants thereby reducing the potential for undersized water treatment plants and water outages. Local governments are encouraged to incorporate smart growth management principles into their land use and water and sewer plans, which they are required to develop every 10 years.

Source Water Protection

The WSP performs well siting, produces source water assessments for groundwater and surface water supplies, and oversees special wellhead protection projects. Before a well is drilled for a public water supply, WSP staff and local officials evaluate the new well site to ensure it is not susceptible to contamination. WSP has also completed over 130

source water assessments, mostly for community water supplies. These assessments determine potential, and sometimes actual, contamination sources and identify the wellhead protection area or watershed on maps. Copies of the report are submitted to local officials and made available to the public and water systems are encouraged to take action to prevent contamination. The WSP also coordinates or conducts several special projects to identify sources of contamination. For instance, dye trace studies have identified the sources of contamination for a number of systems. During 2001, MDE worked with the United States Geological Survey and the Maryland Geological Survey to conduct studies related to virus and arsenic occurrences in Maryland groundwater.

Special Initiatives

The WSP frequently implements special initiatives that affect drinking water systems. Water conservation and security/emergency preparedness are good examples of WSP's special initiatives that are capacity development related.

Water conservation Following the Summer of 1999's drought emergency, Governor Glendening issued an Executive Order establishing two committees to advise him on issues related to water conservation and drought management. These committees were the Maryland Statewide Water Conservation Advisory Committee and the Maryland Technical Advisory Committee. The two committees began meeting in April 2000 and submitted reports to Governor Glendening in November 2000. The WSP was an integral part of both of these committees. In response to the Governor's water conservation initiatives and recommendations from the committees, the WSP began a water conservation program which includes State agencies, water systems, and public education as a means to conserve and preserve State water resources. In 2002, WSP is monitoring the drought status and its effects on drinking water supplies throughout Maryland and implementing the Governor's executive order for mandatory water restrictions in Central and Eastern Maryland. A focus on water conservation promotes capacity development in that it helps to alleviate the immediate water shortage while possibly delaying capital expenditures for new water supplies and larger treatment plants.

Security and Emergency Preparedness Since the tragic events of September 11, 2001, MDE Water Supply Program staff have been in close communication with Maryland's water supply systems, advising them of steps to take to protect their water facilities. A letter and informational checklist were sent to all community water systems to help them assess their vulnerability and determine actions to minimize the risk of terrorist attacks. MDE developed an email database for over 300 water systems and continues to update the water systems with the latest developments such as security related information and FBI advisories.

In general, Maryland's water systems are on alert and have already taken extra precautions such as increasing security and surveillance of key water facility components, increasing the frequency of water quality monitoring, applying optimum treatment and preparing emergency response plans. MDE, in partnership with water suppliers, will continue to work toward minimizing the risk of terrorist acts against Maryland's water systems to ensure that our citizens continue to receive safe drinking water.

Efficacy of the Strategy

WSP's capacity development efforts have focused on completing the strategy's baseline while continuing our current capacity development activities described above and illustrated in the case studies provided in the appendix. Maryland's baseline is composed of information from self-assessment surveys, compliance data, operator certification and sanitary surveys.

Table 3 below summarizes the baseline. A more detailed description of the baseline and efficacy of the strategy follows.

Table 3: Baseline and Future Improvements

Baseline Category	Baseline	Baseline Value	Improvements
Self-Assessment Survey ¹	<i>Managerial:</i>		
	Percentage of unaccounted or lost water (CWS)	Maximum – 35% Average – 11%	Continue to promote water conservation and water audits for all CWS. Request large systems to conduct annual audits with a goal of 10% or less unaccounted water.
	Percentage of CWS aware of the need for additional treatment as a result of future regulations	12% (47 systems)	Increase water system knowledge of the impact of future regulations through training
	<i>Financial:</i>		
	The last time water rates were changed (CWS)	Average Year: 1997	Encourage water systems to periodically improve their rate structure to maintain compliance
	<i>Technical:</i>		
	Percentage of CWS operators/managers that request regulation training	Future rules – 49% (201 systems) Current rules – 36% (145 system)	Ensure that 100% of water systems are provided information on regulations or the opportunity to attend new and existing regulation training.

¹ The self-assessment survey contains 51 questions. The selected questions listed will be used in the near future to assess improvement.

Compliance Data	Number of SNC systems (CWS & NTNC)	51 systems (5%)	Reduce percentage of SNCs on 2003 list to less than 5%
	Lead and copper violations (CWS & NTNC)	201 violations at less than 13% (141) of systems	Reduce number of systems with lead & copper violations to less than 8%
Operator Certification	Percentage of CWS and NTNC systems with certified operators	CWS – 80% (402 systems) NTNC – 40% (225 systems)	Increase percentage to near 100%.
Sanitary Surveys	Percentage of non-regulatory (major, moderate, and minor) deficiencies resolved	Major – 67% (8 resolved) Moderate – 32% (28 resolved) Minor – 56% (24 resolved)	Assist the systems to comply with MDE recommendations with a goal of 80% resolved
	Percentage of CWS and NTNC systems where MDE has conducted a sanitary survey within the last 3 years *	89% (953 systems)	Increase percentage to 100%
	Percentage of CWS systems with emergency plan of operation.	43% (216 systems)	Make available to all water systems technical assistance on emergency plans. Ensure that, at least 100 % of all large and medium water systems have an emergency plan of operation

* Current federal requirement is a minimum of one sanitary survey per system every 5 years.

Self-Assessment Survey

A self-assessment survey was mailed to all community water systems in February 2001. As of June 2002, 409 systems submitted a self-assessment survey. This is a return rate of over 80%. In order to get this return rate, WSP staff called and visited systems to remind them about the survey and to assist them in completing it. Maryland Rural Water Association assisted the WSP in the beginning of 2002 in order to obtain surveys from a few additional systems. WSP will continue to request the remaining water systems to

complete the surveys. It is anticipated that approximately 90% of the surveys will be completed by the end of 2002. As completion of this Survey is voluntary, we anticipate that there will be a number of systems that will not agree to complete the survey or complete it in its entirety. A repeat survey will be initiated every six years.

The capacity development strategy workgroup, which includes training and assistance providers, discussed the results of the survey in June 2002. These training organizations plan to identify the most-important and prevalent shortcomings of water systems and make training or assistance available to them. Since almost half of all Survey respondents stated that they want training regarding future rules and regulations and over a third want current rules/regulations training, it is likely that this training will be made available through one of the training organizations. Information regarding the location of the systems desiring training is available to the training and assistance organizations so that they can determine the most-efficient locations for training. In addition, other information such as common compliance problems will be shared with the workgroup.

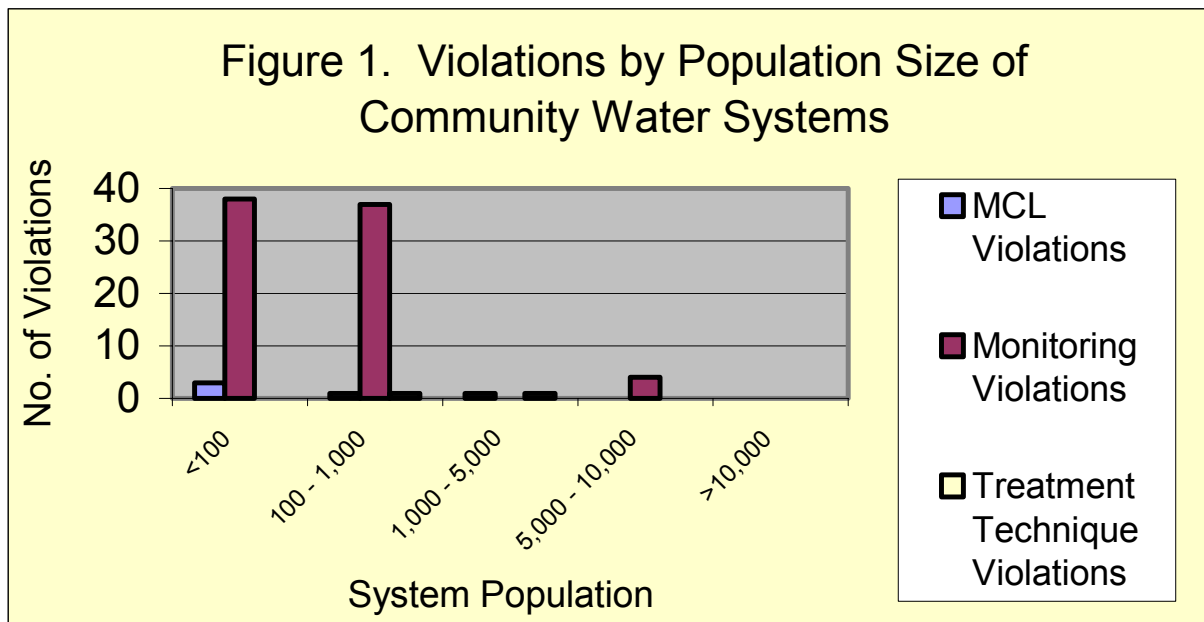
Compliance

The WSP is required to report compliance information in several different ways. Most of the compliance baseline data came from the 2001 Compliance Report and 2000 significant noncompliers (SNC) list to the EPA.

The Safe Drinking Water Act reauthorization of 1996 requires States to prepare and submit annual reports of their drinking water violations to EPA. Maryland's most recent report provides information on water quality standards, and summarizes public water system violations that occurred during calendar year 2001.

A number of activities are undertaken on a routine basis to ensure that public drinking water systems provide safe water to their consumers. Systems are required to sample for up to 83 different contaminants on a routine basis, depending on the size and the type of the system. When contaminants are found at levels exceeding the federally established "Maximum Contaminant Level" (MCL), it is considered a violation of federal and State standards. MCL violations are rare in Maryland for most types of contaminants. During 2001, only one system was in violation for a synthetic organic contaminant. This same system was the only system that exceeded the MCL for a volatile organic contaminant. No inorganic contaminants were found above the MCL during 2001, except for nitrate. Total coliform violations are more common, but occur primarily in smaller systems where treatment may not be present or properly maintained. The number of coliform MCL violations decreased from 395 in year 2000 to 324 in year 2001. Ninety-seven percent of Maryland's community and non-transient non-community systems were in compliance with MCL requirements in 2001. Violations also occurred for failure to monitor, for failure to use required treatment processes, or for failure to notify the public of violations. Over the last three years, MDE has entered into delegation agreements with 21 of Maryland's 23 counties for the oversight of transient non-community water systems. The local delegated programs are continuing to resolve water quality problems at these facilities, and the number of violations has begun to decrease.

Figure 1 presents the various types of violations incurred by community water systems in 2001, based on the population size. Typically, both MCL and monitoring violations occur more frequently in smaller systems, which have fewer resources and less technical expertise for operating the systems. MDE inspectors regularly visit systems with water quality problems to advise and assist system owners to meet their regulatory and water quality requirements. This figure shows that a large percentage of violations are monitoring violations at small drinking water systems.



The EPA has developed a classification system for violating systems. Systems identified as being in Significant Non-compliance (SNC) violators present the greatest risk to health. For instance, failing to monitor for extended periods or greatly exceeding a MCL can be cause for identifying a system as a SNC. WSP's policy is to prevent SNC from occurring whenever possible. However, if a system becomes a SNC, the WSP actively works with them first using compliance assistance and, if necessary, enforcement mechanisms to return them to compliance. WSP considers compliance assistance efforts as the most effective way to assist SNC systems return to compliance. Community and NTNC systems that have a history of SNC are reported on historical SNC lists every three years. The number of SNCs reported in the 2000 list dropped substantially from the 1997 list. The 2000 list contained 51 systems. Most of the improvement occurred because of a reduction in lead and copper violations. Compliance assistance activities such as the issuance of annual monitoring schedules, sanitary surveys, Comprehensive Performance Evaluations, operator certification, financial assistance, and source water protection have proved effective at preventing and correcting SNC. Formal enforcement activities are also conducted and are included as a part of a progressive enforcement policy that includes notice of violations, orders, and civil actions.

There are many challenges and barriers that the WSP and water systems face that limit the effectiveness of reducing non-compliance. These challenges include issues pertaining to the implementation of several new regulations, limited water quantities including drought, financially troubled systems, and system attitudes. MDE's goal is to ensure that the water quality and quantity at all public water systems meets the needs of the public and that the drinking water is in compliance with the federal and State regulations. We will continue to maintain our partnership with water systems to achieve this goal.

Operator Certification

In follow up to recent regulatory changes to operator certification requirements, WSP staff have actively notified and reminded systems of their need to employ certified operators. As a result, a number of systems have acquired certified operators or encouraged their existing operators to become certified. Because we are in the process of compiling data, it is not possible at this time to determine the number of systems without operators. However, during calendar year 2001, at least 80% of community water systems were in compliance with the requirement to maintain a certified operator. At least 40% of nontransient noncommunity water systems employed certified operators.

Table 5 summarizes the operator certification information that is available in the database.

Table 5. MARYLAND OPERATOR CERTIFICATION COMPLIANCE

Water System Type	# Systems	# Systems with Operators	Percentage of Systems with Operators
Community	503	402	80%
Nontransient Noncommunity	568	225	40%
Total	1071	627	59%

Sanitary Surveys

As a result of the Strategy, the WSP begun to track deficiencies and emergency response plans in our database. The determination as to whether systems have deficiencies or the required plan is generally made during sanitary surveys.

An emergency response plan is a document that organizes a community water system's response to various possible emergencies such as a power outage or well outage. They generally include telephone and contact numbers for a number of key personnel including system management, chemical suppliers, equipment manufacturers, well drillers, alternative water suppliers, and MDE. Plans for specific emergencies like power outages and microbiological contamination can also be included. At this time, the database shows that at least 43% of community water systems have emergency plans. This

percentage should grow as sanitary surveys are conducted and systems with plans are noted in the database.

Since WSP staff started to record deficiencies discovered during sanitary surveys, over 142 deficiencies at 123 systems have been recorded in our database. Twelve systems have multiple deficiencies. Deficiencies are characterized as major, moderate, and minor based on the significance to the health or comfort of the systems' customers and the frequency at which the problems are likely to occur. These deficiencies generally do not include violations, since violations are tracked separately in the database. Though not violations of specific regulations, deficiencies have potential public health impact and are generally an indication of technical capacity. Table 6 shows that a majority of deficiencies were moderate deficiencies. Examples of possible moderate deficiencies include substandard well cap, low pressure, and high iron levels with a history of customer complaints. These conditions are less likely to pose an imminent and significant threat to health of consumers than do major deficiencies. Examples of major deficiencies include extremely low pressure in the distribution on a routine basis, a storage tank with a leak, an active open well, severe staffing deficiencies at a surface water treatment plant or other system that needs treatment to meet a contaminant standard, and a well that is likely to be flooded. Minor deficiencies may cause a minor aesthetic nuisance to consumers, inefficient operations, or less-than-optimal plant performance without being a threat to health or comfort of consumers. Examples of possible minor deficiencies include moderate iron or manganese levels with sporadic complaints, and minor safety and maintenance problems.

Table 6: Water System Deficiencies Noticed During Sanitary Surveys

Type of Deficiency	Number of Deficiencies	Percentage of Total Deficiencies	Percentage of Deficiencies Resolved
Major	12	9%	67%
Moderate	87	61%	32%
Minor	43	30%	56%
Total	142	100	

A review of the deficiencies showed that almost half of the deficiencies were due to a well or surface water intake defect. Most of the remaining deficiencies were related to poor maintenance or operations; lack of daily visits to the treatment plant by operators; tank, distribution, or pressure problems; safety or security; and wellhead protection problems.

Efficacy Summary

The successes and challenges of the strategy and baseline as well as goal's for the future are addressed below. In general, implementation of the strategy has been manpower intensive, but has been an informative and important effort.

Self-assessment surveys A majority of WSP's capacity development efforts focused on the development, distribution, tracking, and data entry of the self-assessment surveys. Because WSP wanted to capture a true representation of the community drinking water systems in Maryland and because completion of the self-assessments appeared to be educational for the systems, we repeatedly raised our self-assessment return rate goals. We are approaching a point of diminishing returns on our efforts, especially since completion of the self-assessment is voluntary. However, we anticipate that our continued efforts will likely result in a return rate greater than 90%.

In the future, we will utilize the self-assessment data to determine whether improvements occurred in the areas of water conservation, rate structure, and knowledge of future and current rules including whether additional treatment will be required.

Compliance Maryland has an excellent record with respect to the low number of water systems in violation of SDWA regulations. We will continue to focus attention on particularly recalcitrant systems, significant noncompliers, and systems with a great potential of having significant compliance or public health issues in the future. However, because several new regulations will become effective in the future, we expect that new violations will emerge. This is common when a new regulation is adopted. Hence, disregarding violations due to new regulations, our focus remains on reducing the number of historical significant noncompliers.

Operator Certification Certification of operators has been successful. In particular, the vast majority of community systems are known to have certified operators. Challenges for improvements include a lack of available and/or affordable certified operators and water system attitudes. We will continue to focus our efforts to improve the percentage of systems reported to have certified operators. We anticipate that there will be improvements in the percentage of systems with certified operators in the future and there will continue to be improvements in the capacity of systems as a result.

Sanitary Survey The tracking of sanitary survey deficiencies and emergency plans in a database has been helpful to WSP staff. It is anticipated that the number of deficiencies will increase as additional sanitary surveys are performed. WSP goal is to increase the percentage of deficiencies that are resolved and to continue to offer assistance to prevent deficiencies. In addition, we hope to continue to improve the percentage of systems reported as having emergency plans.

A challenge to implementing this facet of the baseline has involved sanitary survey frequency. Efforts are currently being made to ensure that all community and NTNC systems receive a sanitary survey within three years as has been WSP's goal. As of third quarter 2002, over 89% of these systems have had a sanitary survey within three years. Frequent sanitary surveys should improve compliance and protection of public health in addition to assisting in tracking deficiencies and operator certification and obtaining self-assessment surveys.

General

The past 9/11 security related issues combined with emerging new regulations have placed additional demand on the existing staff. This additional demand could impact the ambitious goal that the program has set for performing sanitary surveys of all CWS and NTNC systems within three years.

Furthermore, sanitary survey staff have taken on additional duties over the course of the last few years, including drought-related work, water conservation, and implementation of new regulations and initiatives such as capacity development. If the workload trend continues, and ability of filling vacancies in a timely manner becomes limited, then there would be a good chance that our excellent compliance rate could become compromised.

A number of WSP's capacity development successes are highlighted in the case studies included in the appendix. These examples illustrate improvements to technical, managerial, and financial capacity. Because capacity development is often needed in smaller water systems, we have included examples at such systems.

Conclusion

The WSP's goal is to continue to improve the ability of Maryland's water supply systems to provide safe and adequate drinking water. The WSP has been an active participant in improving Maryland's drinking water systems in the past, even before a formal capacity development strategy was required. With the initiation of the capacity development strategy, WSP has achieved enhanced tracking of sanitary survey deficiencies, established the water system self-assessment survey and corresponding database, enhanced communication with training assistance providers, continued to provide assistance to systems who have significant potential compliance or health-related issues, developed a written strategy to effectively improve and measure capacity improvements, and identified future implementation challenges. We look forward to improving the capacity of drinking water systems in the future and assessing the effects of our latest capacity development endeavors.

Appendix: Case Studies

WSP has a long history of working with systems to address their violations and to ensure safe and adequate water to the citizens of Maryland. The following case studies highlight recent successful capacity improvement efforts.

Lonaconing Water Company

The Lonaconing Water Company, which serves the towns of Lonaconing, Midland, and Barton, is located in western Maryland. Three reservoirs at Gilmore, Charlestown, and Koontz provide source water. The system serves a combined population of 5,600. Through grants and loans provided by MDE and Farmer's Home Administration, the Lonaconing Water Company constructed three surface water filtration plants in 1993 and 1994. These filtration plants started operations in 1994. Lonaconing hired a contractual service company to operate their plants. As the result of turbidity treatment technique violations that placed Lonaconing on the 1997 SNC list, two boil water advisories, frequent customer complaints and water outages, WSP became very involved in troubleshooting the problems at Lonaconing. In addition, the Town wanted DWSRF loan money for completion of a Water Line Replacement Project. Maryland's regulations require that a system have sufficient technical, managerial, and financial capacity prior to issuance of funding to a system. In 1999, the Town was notified that Lonaconing would not receive funding until capacity was improved. As the result of several meetings with the Towns' officials and other stakeholders, deficiencies in operation, management and equipment maintenance were identified as the reasons for the system's problems. A larger meeting was arranged by WSP that included another financial stakeholder, Farmer's Home Administration. As a result of this meeting, a punch list was generated by the system engineer, a Town representative, and the operating agency that identified deficiencies at the three water plants. In addition to other items, WSP requested that the Town develop standard operating procedures and conduct a water audit to resolve these deficiencies. Much progress was made to resolve the deficiencies through the development of the standard operating procedures and improved communications between the Town and the contractual service company. After several months of repairs and the hiring of a different contractual service company in 2000, steady improvement resulted. The boil water advisories were lifted, water outages were eliminated, and overall public perception of the water quality at Lonaconing improved dramatically. WSP's presence, involvement, and communication to town officials to correct deficiencies in the plants' capacity helped Lonaconing acquire funding, return to compliance, and be removed from the SNC list.

In 2002, the Lonaconing water system received the Water System of the Year Award from the Maryland Rural Water Association.

Chesapeake College

Chesapeake College public water system in Queen Anne's County provides water to approximately 1,000 students, faculty, and staff as well as supplies water to an indoor swimming pool. During sanitary surveys by WSP staff, concerns were raised about their well being an inadequately protected water source. These concerns were further substantiated by a history of positive bacteriological samples. One of the samples was also positive for fecal coliform. WSP staff recommended several improvements to the water system including installation of chlorine disinfection and protection of the well from contamination. During the summer of 2000, the system installed and implemented chlorine disinfection. WSP continued to remind system staff that the well's location in a pit at risk of flooding could lead to future bacteriological contamination. The WSP suggested several possible corrective actions including removing the well out of the pit or extending the well casing and installing a sump pump in the pit. In 2002, several system upgrades were completed, including removing the well out of the pit. Disinfection coupled with a rehabilitated source has greatly improved the microbiological safety of the water and there have been no violations since.

Goodwill Mennonite

The Goodwill Mennonite Home, Inc. retirement community serves water to 285 residents and staff in Garrett County. A sanitary survey during August 2001 identified low system pressure during the late morning hours. High water usage activities such as dishwashing, food preparation, and clothes laundering were all scheduled during the morning, compounding the stress on the water system's ability to provide water at an adequate pressure. Although the system had three production wells, they all yielded low flows. Following an investigation, WSP recommended that the system staff explore altering water use activities, rehabilitating or developing additional sources, expanding storage capacity, or a combination of the above. As a result, the system decided to drill a new well, which has since been approved and connected. Even though the system's pressure problems have been rectified, they are continuing to develop a second high-yield well to further improve the system's reliability.

Tender Years Child Care

The Tender Years Child Care is a daycare that provides water to about 75 children and teachers. In early 2001, routine bacteriological monitoring indicated the presence of fecal coliform. Although the system disinfected the well, fecal coliform was still detected in repeat samples. WSP staff conducted a sanitary survey site visit to locate the source of the problem. It was discovered that the well casing, which is located in a parking lot, showed signs of damage caused by a vehicle. The daycare owner also indicated that the system typically experienced dirty water after rain events. WSP recommended that the system hire a well driller to inspect the well casing, inspect the pitless adapter, and properly disinfect the well. The well driller discovered a crack in the casing below grade and the casing was replaced. Also, the well driller thoroughly disinfected the well. Follow-up monitoring revealed the absence of both fecal and total coliforms.

Town of Betterton

During the past year, there have been numerous occasions when the Town of Betterton has required direct assistance from WSP. Due to the relatively small population, about 500 residents, Betterton has limited resources to tackle water-related problems. The most pressing of these issues involved recent lead and copper monitoring results exceeding action levels. By the time Betterton administrators had recognized this as a problem and requested an exemption to retest the water, they were already in violation. Lack of knowledge regarding water system requirements and the attitude of the operator posed a challenge. Several meetings and phone conversations were held with Town officials to identify deficiencies at the water plant and with the water system. Betterton decided to replace its chief operator with an individual more eager to resolve its current violations. The mayor and town manager also expressed willingness to resolve the outstanding lead and copper violation. Following WSP's direction, the town has completed the necessary initial compliance monitoring required as well as distributed the required public education to all of its customers. Furthermore, operators are initiating a corrosion control strategy that is optimizing the present treatment to ensure that lead and copper will not be an issue in the future.